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555 Eleventh Street, N.W., Suite 1000

Washington, D.C. 20004-1804

Tel: (202) 637-2200 Fax: (202) 637-2201

www.lw.com

LATHAM & WATKINS LLP

ORIGINAL

June 18, 2004

Ms. Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 12th Street, N.W.  
Washington, DC 20554

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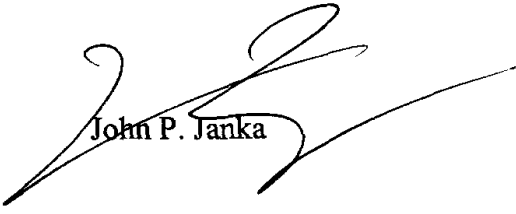
FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

Re: ***Ex Parte Presentation:***  
IB Docket No. 01-185;  
File No. SAT-MOD-20031118-00333;  
File No. SAT-AMD-20031118-00332;  
File No. SES-MOD-20031118-01879

Dear Ms. Dortch:

On June 17, 2004, Alan Auckenthaler, General Counsel of Inmarsat Ventures Limited ("Inmarsat"), Jonas Eneberg, Spectrum Manager of Inmarsat, Richard Barnett of Telecomm Strategies, and I, met with Ed Thomas and Bruce Franca of the Office of Engineering and Technology. The attached presentation and Inmarsat's positions of record formed the basis for the discussion.

Respectfully submitted,

  
John P. Janka

Enclosure

cc: Bruce Franca  
Ed Thomas

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# **MSV ATC Application and ATC Reconsideration Process**

FCC

17 June 2004



# Overview

- Two years of studies and debate led to the FCC ATC Order
- The Order strikes a reasonable balance between different interests and provides rules for interference protection for MSS at L-band
  - Inmarsat has outstanding concerns regarding the enforcement of some rules and the adequacy of certain limits
  - MSV's proposed changes would undermine the basis and balance of the Order
  - The ATC service rules create a delicate balance of protections and no one rule should be modified or waived in isolation
- MSV's ATC application seeks 12 rule waivers and contains numerous deficiencies
- No ATC application should be approved until the ATC rules have been finalized

# Summary of MSV requested waivers

1. A waiver to increase by 17 times the number of ATC base stations permitted based on:
  - a. Requiring Inmarsat to accept 6%  $\Delta T/T$  uplink interference from ATC
  - b. MSV deploying 80 percent of its ATC base stations in the U.S.
  - c. MSV's MT's allegedly having an average antenna gain of  $-4$  dBi or less when operating in the "ATC mode", and
  - d. MSV's proposed use of a new self-interference cancellation technique
2. A waiver of the requirement to use quarter-rate vocoders
3. A waiver to permit the unlimited use of non-co-channel frequencies not currently used by any other MSS operator whose satellite is visible from the U.S.
4. A waiver to loosen the emission limit protections on L-band ATC base stations and loosen the aggregate EIRP permitted per sector
5. A waiver to loosen the emission limit protections towards the physical horizon on L-band ATC base stations
6. A waiver to loosen the rule protecting aeronautical MSS services
7. A waiver to loosen the rule protecting maritime MSS services
8. A waiver to loosen the overhead gain suppression restrictions
9. A waiver of the 90,000 mobile terminal peak traffic limit
10. A variance to permit use of CDMA architecture
11. A waiver of satellite ground spare requirement, and
12. A variance from the use of a "safe harbor" dual mode handset necessary to demonstrate an integrated MSS/ATC system

# MSV requested waivers

- MSV's 12 requested waivers and variances would fundamentally change the nature of MSS in the L-band
- There is virtually no aspect of the ATC service rules that MSV did not try to modify in its ATC Application
- In addition to requesting these waivers, MSV has failed to demonstrate that it complies with the crucial 18 dB structural attenuation requirement
- MSV's proposals would result in unacceptable interference to Inmarsat, including to vital safety services

# Potential impact of MSV requested waivers and deficiencies

MSV WAIVER OR DEFICIENCY	INCREASE IN UPLINK INTERFERENCE
Failure to demonstrate compliance with 18 dB structural attenuation requirement	Up to 63x (18 dB)
Request to allow ATC to generate 6% $\Delta T/T$ into Inmarsat uplinks	~4.3x (6.3 dB)
Failure to base uplink analysis on "average" vs. peak mobile terminal antenna gain	2.5x (4 dB)
Failure to adjust for CDMA architecture	Up to 2.2x (3.5 dB)*
Failure to adjust for use of half-rate vocoders	1.6 to 2.5x (1.5 to 1.8 dB)*
Request to increase density of ATC base stations in the U.S.	1.6x (2 dB)
RESULTING POTENTIAL INCREASE IN INTERFERENCE	Up to 2433x (33.9 dB)

\* These two factors are related, so that the maximum increase in interference due to both is limited to 3.5 dB

# Structural attenuation margin

- Inmarsat has repeatedly highlighted the criticality of this requirement and its concern that it may not be adhered to in practice
- MSV provided no demonstration of how they intend to comply
- The FCC should require MSV to provide a detailed demonstration that guarantees that the 18 dB margin is implemented and used only for operation inside buildings
- The requirement to demonstrate compliance with the 18 dB structural attenuation rule is as fundamental to constraining ATC interference as a 2 degree spacing analysis is to constraining interference into other satellite networks

# Increased ATC reuse from 1,725 to 29,571

- MSV's proposal would lead to an increase of more than 17 times in uplink interference levels
- MSV's justifications for the increase are in three parts:
  - Increase in permissible  $\Delta T/T$  from 1.4% to 6%
  - Redistribution of the "permitted" reuses
  - Claim that ATC mobile terminal antennas provide 4 dB more isolation than assumed by the FCC
- None of these justifications are consistent with the Commission's analysis



# Basis for the 1,725 limit

- The FCC adopted the 1,725 limit to constrain MSV self-interference to 6%  $\Delta T/T$  and thereby protect Inmarsat
- An increase in the limit would result in MSV self-interference exceeding 6%  $\Delta T/T$  and also increase interference to Inmarsat
- MSV's claim that they can limit self-interference through interference cancellation techniques is highly dubious as shown in Inmarsat's Opposition to the MSV ATC application
- In the absence of interference cancellation, an increase by 17 times would destroy MSV's satellite service, unless MSV dilutes its satellite frequency reuse
- Regardless of whether MSV's proposed interference cancellation technique works, it offers no protection for Inmarsat

# $\Delta T/T$ Requirement

- The total allowance for interference from all external sources in an MSS system is 20%  $\Delta T/T$  (ITU-R Rec. M.1183)
- 6%  $\Delta T/T$  is the standard single-entry interference criterion for satellite systems and applies to the MSV MSS system for interference into Inmarsat
- The FCC has adopted the ATC Order on the basis that ATC is an integral part of an MSS system – therefore the 6% criterion applies to the aggregate interference from MSV's satellite and ATC transmissions
- The FCC has stated that L-band MSS frequency coordination shall be unaffected by the introduction of ATC - hence, ATC interference must be a negligible part of the total MSV interference
- At most, a 1%  $\Delta T/T$  allowance is appropriate for all secondary services, including ATC
  - The FCC limits are based on 0.7%  $\Delta T/T$  from U.S.-based ATC and an expected similar interference from other countries

# Redistribution of reuses

- MSV wrongly claims that the FCC has permitted a total of 3,450 reuses
- The FCC can only regulate the deployment of ATC within the U.S.
- The FCC clearly limited MSV to 1,725 reuses within the U.S.
- For the sake of analysis the FCC considered the impact of an additional 1,725 ATC reuses outside the U.S.
- Canada intends to permit ATC with *no reuse limit*
- MSV's proposal to deploy a greater number of ATC stations within the U.S. would increase the density of ATC stations and thereby increase interference to Inmarsat

# ATC MT antenna gain

- MSV has made no change to its ATC MT antenna design
- MSV has not clearly represented the power into the terminals, the peak gain of the antenna or the resulting peak EIRP
  - Based on the information in MSV's ATC application, it appears that the peak MT EIRP is +2 dBW
- Throughout the proceeding, peak MT EIRP has been used in the analysis
- Hence, there is no basis for changing the Commission's analysis, and no basis for increasing the number of reuses and thereby the interference to Inmarsat

# Vocoder issue

- MSV proposes a change to the vocoder duty cycle schedule
- As demonstrated in Inmarsat's Opposition to the MSV ATC application, the schedule proposed by MSV would not achieve the 3.5 dB interference reduction that was intended
- MSV's proposal therefore increases the interference to Inmarsat above the level intended by the ATC Order
- MSV must also implement a mechanism to ensure the same 3.5 dB interference reduction when CDMA technology is used

# Inmarsat terminal interference threshold

- The FCC assumed an interference threshold of  $-60$  dBm
- MSV proposes a threshold of  $-45$  dBm
- Inmarsat has shown that the measurements on which MSV bases its proposal are flawed
  - They don't take into account the complete receiver chain
  - They ignore the effects of intermodulation
- Inmarsat terminals manufacturers Nera and Honeywell have demonstrated that the actual interference threshold is  $-75$  dBm (or lower)
  - Nera provided measurements of land based terminals
  - Honeywell explained that the ARINC standard referred to is not the limiting factor for aero terminals
- A number of ATC rules should be modified to account for the correct interference threshold

# Conclusions

- MSV's proposals would result in unacceptable interference to Inmarsat
- MSV's proposed self-interference cancellation technique
  - Is not feasible and would therefore not protect MSV
  - Would not protect Inmarsat under any circumstance
- High levels of MSV self-interference would waste MSS spectrum
- MSV's ATC application is incomplete in a number of material respects
- The FCC should adjust its ATC rules based on Inmarsat's limited requests
- The FCC should require MSV to comply with the adopted rules and dismiss its application